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COURT AVENUE BRIDGE
(Des Moines River Bridge)
Iowa Bridges Recording Project
Spanning Des Moines River
at Court Avenue
Des Moines
Polk County
Iowa

HAER No. IA-70

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HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
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Location: Spanning Des Moines River at Court Avenue, Des Moines, Polk County, Iowa.
UTM: 15.448530.460750
USGS: Des Moines SE, Iowa quadrangle (7.5 minute series, 1976)

Date of Construction: 1918

Designer: Marsh Engineering Company, Des Moines, IA

Contractor: Koss Construction Company, Des Moines, IA

Present Use: City Street Bridge

Significance: The Court Avenue Bridge is a major river crossing for the city of Des Moines. Erected in 1918, it is an outstanding example of a structurally sound, aesthetically pleasing, and economical multiple-span concrete arch bridge.

Historian: Juliet Landler, engineer, August, 1995

Project Information: This document was prepared as part of the Iowa Historic Bridges Recording Project during the summer of 1995 by the Historic American Engineering Record (HAER). The project was sponsored by the Iowa Department of Transportation (IDOT). Preliminary research on this bridge was performed by Clayton B. Fraser of Fraserdesign, Loveland, CO.

The opening of the new Court Avenue Bridge was cause for great celebrations in downtown Des Moines the night of July 10, 1918. Mayor Tom Fairweather began the festivities with the first official trip across the bridge at 8 pm, leading the parade. After the few customary speeches were made, the band started up again, and before long, thousands were dancing elbow to elbow on the deck of the capitol city's latest civic monument, confident that it would not fall down. Despite the massive crowds, few incidents marred the spirited event, and bridge was immediately hailed as a grand success.¹ "It is a step in the development of a city that will make for the comfort and prosperity of its citizens," praised the speaker who gave the dedicatory address.² In a city that already had 15 other river bridges spanning the Des Moines and Raccoon Rivers, the Court Avenue Bridge held particular significance because it marked the chief crossing between the east and west sides of Des Moines and the State House and the new municipal courthouse.

Des Moines was a city familiar with bridges and bridge mishaps. It began as a military outpost, established to protect Indian territory from the first droves of pioneers seeking land in the West. The first fort was built at a strategic spot where two rivers met. The Des Moines River served as its eastern border, the Raccoon River as its southern border. When the surrounding lands were opened in 1838, Fort Des Moines ceased its military operation, and dropping "Fort" from its name, remained the area's most important settlement. After Iowa became a state in 1847, Des Moines was named its capitol. During the early days of the city, there were no bridges. Early residents forded the rivers until a few enterprising men began ferry operations in the 1840s. In 1855 the town paid to build a bridge across the Des Moines River, but it was a poorly constructed pontoon bridge and only lasted two years.³ By this time, plans for two more bridges

¹The Des Moines Register gave a review of the affair in the next day paper in an article on page 2, "Festive Affair at Opening of Bridge." A separate article appearing on the first page, "Sailor Rescues Flag from Place of Dishonor on New Des Moines River Bridge", reported that a sailor attending the event became incensed at the treatment of four United States flags, which were trampled by the throngs of dancers after being nailed to the bottom of four posts on the bridge.

²"Festive Affair at Opening of Bridge." Des Moines Register. July 11, 1918, p.2.

³Will Porter, *Annals of Polk County, Iowa and City of Des Moines*. Geo. A. Miller Printing Company. 1898. 669.

across the Des Moines were under way. Workers rushed to finish a trestle bridge at Market Street in 1857, and poor craftsmanship once again led to downfall when it collapsed two years later. The bridge was reconstructed, only to be swept away by high waters in 1861. Fortunately by this time, the second bridge was in place at Court Avenue, having been completed in 1858.⁴ The original Court Avenue Bridge received a reception not so different from its successor's 60 years later. The newspaper at the time reported, "the splendid structure stands out in its beautiful proportions to attract the eye and to accommodate the necessities of the people. It is an honor to the builder, the company and the city."⁵ However, the wooden structure fared only slightly better than the others. It deteriorated quickly, and the bridge's architect, U.B. White, was forced to rebuild it in 1866. Three years later, White's structure was destroyed by a flood. In 1870 the city built new piers and erected an iron bridge, a Post Truss, which was highly acclaimed and lasted until it was demolished and replaced by the current bridge.⁶

When the new Court Avenue Bridge opened in 1918, it was the fifth concrete structure to span the Des Moines. Although not quite the longest with a length of 496 feet, it was certainly the largest due its extraordinary width of 99 feet. The bridge, with a 69 foot roadway and two 15 foot sidewalks, was reputedly the widest bridge in the United States.⁷ Five arches, each with spans of 92 feet, comprised its length. It was constructed with the latest reinforced concrete technology available. Having continuous reinforced concrete beams and ribs, and an open spandrel design, these features are concealed by spandrel curtain walls to receive a stone veneer. To suit architectural tastes of the time, the bridge was faced with Bedford cut stone, and embellished with ornamentation. The guardrail was also of ornamental design, as were the one thousand lineal feet of river walls that were constructed to complement the structure.⁸

⁴Ibid. 669-70; J.M. Dixon, *The Centennial History of Polk County*. 1876. 142.

⁵George Mills, *Looking in Windows: Surprising Stories of old Des Moines*. Iowa State University Press. 1991. 42.

⁶Dixon. 142; Porter. 670.

⁷"Festive Affair at Opening of Bridge." *The Des Moines Register*. July 11, 1918.

⁸"Court Avenue Bridge to be Opened Wednesday." *Des Moines Sunday Register*. July 7, 1918.

Despite the efficient open spandrel design, massive amounts of materials were consumed in the construction of the Court Avenue Bridge. The announcement of its opening provided an inventory:⁹

- 12,300 cubic yards concrete.
- 25,000 lineal feet of foundation pile.
- 10,000 lineal feet of falsework pile.
- 15,000 cubic yards of excavation.
- 250,000 feet of lumber in cofferdams.
- 150,000 feet of lumber in falsework.
- 300,000 lineal feet lumber in concrete forms.
- 10,800 cubic feet of cut Bedford stone facing.
- 1,000 lineal feet of Bedford cut stone hand rail.
- 550,000 pounds of reinforcing rods.
- 3,000 square yards of asphalt paving.
- 6,200 cubic yards of sand.
- 11,100 cubic yards of crushed stone.

These figures did not include materials used to construct the river walls. The total cost of the bridge, including river walls, was \$240,000.¹⁰

As was the case for many of Des Moines' bridges, controversy surrounded the selection process. Both the city engineering department and a local engineer, James B. Marsh, submitted plans for the Court Avenue Bridge and another structure of similar dimensions to be built at Grand Avenue at about the same time. The city council selected the city engineer's design for Grand Avenue Bridge, and Marsh's design for the Court Avenue Bridge. In announcing the decision, Mayor MacVicar made the mistake of saying, "as regards beauty, harmony with its surroundings, cost of construction and strength," Marsh's plans were superior to the county's specifications.¹¹ When pressed on the question as to why Marsh's plans weren't chosen for both structures since they were seemingly better in all respects, the mayor had no response. MacVicar stood by the council's decision, and the contract for Court Avenue Bridge was awarded to Koss Construction Company of Des Moines.¹²

⁹Ibid.

¹⁰Ibid.

¹¹As cited in the HAER Inventory report, *Iowa Historic Bridge Inventory*, written by Clay Fraser of Fraserdesign, 1993.

¹²Fraserdesign, *Iowa Historic Bridge Inventory*. 1993.

By 1917, engineer James Barney Marsh had almost thirty-five years of experience in bridge design, and had helped to construct several of the city's bridges. Marsh was a local success story. He was born in North Lake, Wisconsin in 1856, but came to Iowa at age eighteen to attend a preparatory school in Fredericksburg. He continued his studies at Iowa State College of Agriculture and Mechanic Arts (now Iowa State University) in Ames, and obtained a bachelor's degree in Mechanical Engineering in 1882. He began his professional career in the Des Moines office of the King Iron Bridge Company where he designed, marketed, and supervised the construction of truss bridges throughout the state. He worked in this capacity for five years. In 1887 he accepted a position to head the Des Moines office of the Kansas City Bridge and Iron Company. Two years later, Marsh moved back to King Iron Company to become its general western agent and contracting engineer, a position he kept for seven years.¹³ In 1896, Marsh left King Iron to start his own consulting engineering practice. In 1904, he expanded his business to include bridge building calling his newly incorporated organization, Marsh Bridge Company. He reorganized the firm again in 1909, changing the name to Marsh Engineering Company.

During his years at King Iron Bridge Company and the Kansas City Bridge and Iron Company, Marsh had become an expert in steel truss construction. However, soon after he struck out on his own, his interest turned to concrete. By 1903, Marsh had designed two concrete bridges, one for Kankakee, Illinois and another for Kenosha, Wisconsin. Typically, Marsh would construct bridges from his own designs, but on more than one occasion, he bid on other bridge designers' plans as well.¹⁴ In the 1910s Marsh won commissions to design several major city bridges in Iowa: the Fourth Street Bridge in Waterloo, and the Second Avenue Bridge in Cedar Rapids, and the Walnut Street Bridge in Des Moines.¹⁵

Marsh had done other major projects in the capital city in addition to the 503' concrete span at Walnut Street. In fact, he supervised the construction of two bridges at Locust Avenue: the first, a multiple-span Pratt truss, built by King Iron Bridge

¹³"A Good Bridge Man." *The Saturday Review*. Des Moines. Feb. 11, 1893.

¹⁴In 1905 Marsh was awarded the contract to build a bridge in Trinidad, Colorado using a design of Daniel Luten, an archrival who would sue Marsh in 1912 for patent infringement. (HAER no. IA-29, Fraserdesign, p.4).

¹⁵HAER Report no. IA-29, Fraserdesign, p.4.

Company in 1880s, and the second a concrete bridge built by the Marsh Bridge Company in 1907-08. Of the three major concrete spans in which Marsh had played fundamental roles, the Court Avenue Bridge was the largest and most expensive project. The Locust Bridge, exclusive of river walls, was 66' wide and cost \$124,800; the Walnut Street Bridge was 82 1/2' wide and cost \$169,661.¹⁶

Unlike the designer of Court Avenue Bridge, the contractor George Koss was not very experienced, and this project marked his first major commission. However, like Marsh, Koss would move on to achieve great things. Koss had first gained knowledge in bridge building by working as agent for Chicago and Northwestern Railroad after graduating with a C.E. from Rensselaer Polytechnic Institute in Troy, New York. Tired by the long days on the road, Koss quit in 1914 to start his own company which he based in Des Moines. The company's early projects included many small bridges built for the Iowa State Highway Commission in rural parts of the state. Whenever Koss received such a project, he would erect tents and temporary shelters at the construction site so that he and his employees could live there and spend as little time as possible traveling on Iowa's primitive road system. This also was very cost-efficient, and before long, Koss had acquired the financial base necessary to bid on larger contracts such as the Court Avenue Bridge and the Seventh Street Viaduct, both of which he was awarded.¹⁷

After Koss constructed Court Avenue Bridge, he expanded his operation into the states of Michigan, Illinois, Arkansas, and Tennessee. Prior to point, the speciality of his company had been concrete bridges, but as the "good roads" movement swept the Midwest, Koss saw the opportunity to diversify its services. In a timely move, he switched the focus from concrete bridges to concrete highway paving, and soon Koss Construction was paving the roads in much of Iowa and neighboring states. The company, still prospering in Des Moines, continues to be engaged in major civil works building bridges, dams, water treatment plants, flood barriers, and airport runways throughout the United States.

For many years after its construction, the Court Avenue Bridge required little maintenance. In 1952 a 5" concrete slab was added to the existing bridge deck, and in 1953, a \$21,000 contract was let for additional work. The bridge has undergone

¹⁶"Court Avenue Bridge to be Opened Wednesday." *The Des Moines Sunday Register*. July 7, 1918.

¹⁷Dahl, Orin. *Des Moines: Capital City*. Continental Heritage, Inc. Tulsa, OK. 1978. 214-15.

two significant refurbishments. The first, in 1969, repaired pier noses and replaced about a third of the floor beams and arch ribs located below the gutter sections of the bridge, which were spalling because of water damage. The cost of the job rivaled the original price of the bridge.¹⁸ Twenty years later the bridge was closed again for even more extensive repairs. This time for an estimated \$2,186,000, the deck was replaced and stonework restored in an effort to maintain the structural and historical integrity of the bridge.¹⁹ Today the bridge is structurally sound and carries four lanes of traffic.

¹⁸City Engineers Office. "Court Avenue Bridge Restoration" - project proposal prepared by Dick Goecke. Feb 8, 1968.

¹⁹City Engineers Office. "Project Concept Statement." March 29, 1979.

SOURCES CONSULTED

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ADDENDUM TO
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This appendix is an addendum to a 8-page report previously transmitted to the Library of Congress.

APPENDIX: ADDITIONAL REFERENCES

Interested readers may consult the Historical Overview of Iowa Bridges, HAER No. IA-88: "This historical overview of bridges in Iowa was prepared as part of Iowa Historic Bridges Recording Project - I and II, conducted during the summers of 1995 and 1996 by the Historic American Engineering Record (HAER). The purpose of the overview was to provide a unified historical context for the bridges involved in the recording projects."